

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**Before the Board of Patent Appeals and Interferences**

In re Patent Application of

DAIROKU et al.

Serial No. 10/764,444

Filed: January 27, 2004

For: METHOD OF MANUFACTURING WATER-ABSORBING SHAPED  
BODY



Conf. No.: 8698

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TC/A.U.: 1742

Examiner: Huson, M. A.

\* \* \* \* \*

February 1, 2011

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**REPLY BRIEF**

Appellants submit this Reply Brief in response to new issues raised by the Examiner's Answer mailed on December 3, 2010 and to supplement their arguments in the Appeal Brief which was filed on September 17, 2010. Any reply is due within two months from the mailing of the Examiner's Answer. Therefore, this Brief is timely filed; being filed on February 1, 2011.

In accordance with M.P.E.P. § 1208 and 37 CFR § 41.37(c), this page contains item (A) and the following pages contains the other required items: (B) Status of claims, (C) Grounds of rejection to be reviewed on appeal, and (D) Argument.

Reversal of the Examiner's claim rejection by the Board of Patent Appeals and Interferences (the "Board") is respectfully requested.

DAIROKU et al.  
Serial No. 10/764,444

**STATUS OF CLAIMS**

Claims 1-3 and 6-22 are the only claims pending, they all stand rejected and are at issue in this appeal.

**GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

A. Under 35 U.S.C. § 103(a), was it proper to reject claims 1-3, 6-11 and 13-22 as allegedly unpatentable over Golander et al. (U.S. Patent No. 4,840,851) in view of Vesley et al. (U.S. Patent No. 6,960,275).

B. Under 35 U.S.C. § 103(a), was it proper to reject claim 12 as allegedly unpatentable over Golander et al. (U.S. Patent No. 4,840,851) and Vesley et al. (U.S. Patent No. 6,960,275), and further in view of Phan et al. (U.S. Patent No. 6,022,610).

Appellants respectfully state that these rejections were not proper and offer the following arguments in support of their statement.

## **ARGUMENTS**

Appellants have presented reasons why claims 1-3 and 6-22 should be considered nonobvious and should be allowed in the Appeal Brief filed on September 17, 2010. Appellants wish to respond to the Examiner's Answer of December 3, 2010 in this Reply Brief.

### **Response to Examiner's Answer**

In Response to the Examiner's Answer of December 3, 2010, Appellants note that Section (9) Grounds of Rejection is, with the exception of the first line identifying said section as applicable to the appealed claims, identical to the words of the final Rejection of March 17, 2010. Therefore, the issues in Section (9) Grounds of Rejection have been addressed in Appellants Appeal Brief of September 17, 2010.

Appellants address below the new issues raised in Section (10) Response to Argument of the Examiner's Answer. In addressing the new issues, Appellants use the same nomenclature used by the Examiner (e.g., Ground 1:1, Ground 1:2, etc.).

### **Ground 1:1**

The Examiner objected to the term "partially cross-linked gel." Appellants note that the underlying scientific arguments are still valid and present amended section (1) and amended section (5) of Appellant's arguments below to remove the phrase "partially cross-linked gel."

1. (Amended) There are significant and patentable differences between the claimed invention and the cited references.

The claimed invention is directed to a method of manufacturing a water-absorbing shaped body which can be produced to avoid the use of thickening agents and thus to avoid (1)

handling problems and high labor costs due to high viscosity when thickening agents are used and (2) deteriorating performance of water-absorbing shaped bodies produced with thickening agents. See, Appellants' Specification, page 3, last paragraph. To achieve this goal, the claimed methods, in one embodiment, include the steps of: (1) polymerizing an aqueous solution including a photo polymerization initiator, a radical polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both by radiating light intermittently onto the aqueous solution; (2) applying heat after the light is radiated; (3) shaping the polymerized aqueous solution; and (4) drying the water-absorbing shaped body obtained after the polymerization. In another embodiment, the claims refers to the steps of (1) a first polymerization step of radiating light onto an aqueous solution including a photo polymerization initiator and a water-soluble ethylenically unsaturated monomer containing at least 50 mol% of acrylic acid, an acrylic acid salt or both, so as to polymerize a part of the water-soluble ethylenically unsaturated monomer to thicken the aqueous solution; (2) a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step; and (3) a second polymerization step of radiating light onto the aqueous solution shaped in the shaping step. See, e.g., instant claims 1, 7, 21 and 22 for a detailed description. Significantly, none of these problems were recognized and none of the solutions were made obvious by a combination of Golander or Vesley.

In contrast to the current Application, Golander is in "the field of surface coating of a substrate" that is applying a polymeric coating containing ethylene oxide units as the primary structural units; *see* Golander, column 1, lines 7-10. While Golander describes the curing of a polymeric product, there is no discussion or suggestion in Golander to the shaping of an aqueous

solution containing partially polymerized water-soluble ethylenically unsaturated monomer.

That is, there is nothing in Golander that corresponds to or render obvious the claimed step of “a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step” in claims 7 and 22. Furthermore, the materials used in Golander are quite distinct from those specified by the claims of the present application (see discussion in detail below and in the Appeal Brief of September 17, 2010)

Vesley is cited for a procedure in which a viscous aqueous solution is (1) polymerized by irradiating the aqueous solution with light and (2) shaped into a film. There is no disclosure in Vesley of (a) initial irradiation, (2) completely stopping the radiation with light, (3) shaping the thickened aqueous solution in a shaping step and followed by (4) final irradiation and cure. That is, there is nothing in Vesley, or a combination of Golander and Vesley, that corresponds to or render obvious the claimed step of “a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step” in claims 7 and 22. As with Golander, Vesley uses a very different polymeric solution primarily based on viscoelastic materials; *see* Vesley, column 1, lines 18-20 and a more detailed discussion at column 6, lines 28-39. Vesley’s viscoelastic pressure sensitive materials are prepared using a release surface to which the materials are applied then irradiated or otherwise cured. Therefore, like Golander, Vesley is very different from the claimed invention.

5. (Amended) The combination of the cited references does not disclose shaping of a partially polymerized solution or two polymerization steps.

A combination of Golander and Vesley does not render obvious procedures recited in Appellants’ claims (see, e.g., claims 7-15, 17, 18, and 22) where there is a first polymerization

step to polymerize part of the monomer and thicken the aqueous solution followed by stopping the radiation, a shaping step to shape the thickened aqueous solution which is then followed by a second polymerization to polymerize the solution. While Golander describes at column 7, lines 11-26, partial then final curing, it is important to note Appellants' claimed shaping step, "a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step" is not disclosed or render obvious by Golander. As discussed above, Golander describes reagents that are quite distinct from those specified by the claims of the present application. That is, not only does Golander not describe or render obvious the claimed step of "a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step", Golander does not describe the claimed step performed with a water-soluble ethylenically unsaturated monomer containing "at least 50 mol% of acrylic acid, an acrylic acid salt or both."

The defects of Golander, as outlined above, are not cured by the addition of Vesley. Vesley, actually does not disclose the claimed steps because there is no disclosure in Vesley of the claimed step of "a shaping step of stopping radiation of the light, and shaping into a desired shape, the aqueous solution thickened in the first polymerization step" followed by a second polymerization step. Appellants submit that the part of Vesley which is indicated by the Examiner as pertinent fails to disclose a shaping step. Specifically as evidenced by Figure 1, the part of Vesley which is indicated by the Examiner to be pertinent merely discloses coating a curable composition onto a surface and curing said coating while the coating is peeled off. Significantly, Vesley's process completely fails to disclose an arrangement corresponding to the arrangement of (1) stopping the radiation of light, and (2) shaping an aqueous solution which includes a polymer as a part thereof (a shaping step). Appellants note that Vesley does not show

anywhere that the shape of the product is changed. That is, the Vesley shows a process where an article is treated by multiple sources. There is no indication that the radiation of light is stopped and there is no indication that a shaping process is involved between two polymerizations - of course, since there is no stoppage, it cannot be considered two polymerizations (see Vesley, column spanning cols. 4 and 5). Vesley is merely treating a product with two sources in Figure 1 without any indication that the article changes shape. For this reason, a combination of Golander and Vesley would not lead to the claimed invention. Also, as with Golander, Vesley also uses a very different polymeric solution from Appellants' claims.

Additional Argument in Response to Ground (1:1)

The Examiner alleged that "While the composition is being transported on the roll, and at nip 124, shaping is being imparted to the composition (See also, column 8, lines 22-49). (Note that a shape change is not necessarily claimed)." Appellants note that "the shaping step" is defined in the Specification on pages 15 (lines 9-10) and 19 (lines 1-3) as "shaping the thickened aqueous solution into a desired shape (a shaping step)." Furthermore, the claims clearly recite that the shaping step is "shaping into a desired shape." See, claims 7 and 22. Therefore, the relevant question is not whether the cited references teaches or render obvious the process step of "shaping", the relevant question is whether a combination of Golander and Vesley render obvious the process step of "shaping into a desired shape" between a first and a second polymerization step as recited in claims 7 and 22. The Examiner has failed to show that a combination of Golander and Vesley renders obvious the process step of "shaping into a desired shape."



**Ground 1:2**

The Examiner has maintained that the claimed limitations of at least containing at least 50 mol% of acrylic acid (claim 1), at least 80 mol% of acrylic acid (claim 19) and at least 95 mol% of acrylic acid (claim 20) are obvious and are merely optimization of Golander's Example 7. The Examiner states in the Examiner's Answer that the subject invention is obvious based on MPEP 2144.05(II)(A). That is, the Examiner regards the subject invention as being "optimization through routine experimentation".

The ground of MPEP 2144.05(II)(A) is based on *In re Aller*, 220 F.2D 454, 456, 105 USPQ 233, 235 (CCPA 1955) (Claimed process which was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%.) etc. However, *In re Aller's* is inapplicable in this situation because, in the current situation, the claimed invention is directed to an entirely different process than cannot be derived from optimization of Golander's Example 7.

Golander's Example 7 is not Appellants claimed invention. As the Examiner has admitted in the Examiner's Answer on page 3 line s 23-25 "Golander does not specifically show at least 50 mol% (Claim 1), at least 80 mol% (Claim 19), or at least 95 mol% (Claim 20) however he does show using acrylic acid in equimolar amounts with another reactant in Example 7." A part of Golander's Example 7 is reproduced below. The complete Example 7 can be found in the Specification of Golander.

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EXAMPLE 7

Cell and platelet adhesion

Equimolar amounts (0.01 mol) of monoacrylated  
PEG 1900 and hexanediol diacrylate were dissolved in  
a mixture of toluene-cyclohexanone-ethanol, one part  
by weight of each, and diluted to a final solids content  
of 0.5% by weight.

The solution was applied to

(a) PVC films and PMMA sheets, each with the di-  
mension of 3×3 cm, by using a spiral rod applicator  
giving a thickness of 1 μm.

(b) The insides (lumens) of nearly transparent PE  
tubings with a length of 1 m and an inner diameter of 2  
mm were treated by pouring the solution through the  
lumen with a pipette. Prior to application of the PEG  
film the PE tubings were made hydrophilic by exposure  
for two minutes to conc. sulphuric acid containing 2 g/l  
of potassium permanganate followed by thorough rins-  
ing in water.

For both groups of substrates the solvents were evap-  
orated to dryness before curing. All items were cured  
for 15 minutes in a Minicure instrument. Especially the  
inside of the tubings need to be cured for a long time  
since light scattering and absorbance occur in the tubing  
material.

First, Appellants note that the claims under appeal invention relate to and specifically recite, inter alia, polymerizing an aqueous solution. Golander's Example 7 is simply unrelated to the claimed invention at least for the following reasons. First, Golander does not use an aqueous solution. Golander's Example 7 used a toluene-cyclohexanone-ethanol solvent which cannot be considered as an aqueous solution. Second, Golander does not polymerize a solution of any kind. As can be seen in Golander's Example 7, Golander states "for both groups of substrates, the solvents were evaporated to dryness before curing." Since Golander's Example 7 relates to curing after drying, it is not polymerizing an aqueous solution or any solution. Third, at best,

Golander shows polymerization with one concentration of acrylic acid. There is no indication that Golander teaches or render obvious any other concentration of acrylic acid. There is a significant difference between an equimolar solution of acrylic acid and at least 80 mol% of acrylic acid (claim 19) and at least 95 mol% of acrylic acid (claim 20) and there is no scientific basis for one of ordinary skill in the art to assume that a reagent (acrylic acid) that functions at an equimolar ratio can function at least 80 mol% of acrylic acid or at least 95 mol%.

For at least any one of the reasons stated above, Golander's Example 7 is not relevant to Appellants claims related to polymerizing of aqueous solution. Golander does not disclose acrylic acid in an aqueous solution in Example 7 and Golander does not disclose polymerizing of any solution in Example 7.

*In re Aller's* is inapplicable at least because Appellants' claimed invention cannot be derived merely by adjusting the mol% of acrylic acid of Golander's Example 7 as the Examiner asserts. Regardless of the mol% of acrylic acid used in Golander's Example 7, Golander's Example 7 is still a non-aqueous process and is still a dry (i.e., not in solution) process. Routine optimization would not include the complete substitution of a toluene-cyclohexanone-ethanol solvent with an aqueous solvent, would not involve the replacement of a solution process for a dry process, and would not involve drastically changing the mol% of acrylic acid. Finally, changing all three parameters at once (organic to aqueous solvent, dry to aqueous polymerization, changing mol% of acrylic acid) would certainly not be a part of routine optimization.

### **Ground 1:3**

The Examiner argues that one of Appellants' arguments is that Golander is not applicable because Golander uses different material. It is the Examiner's position that Golander uses the

same materials as the claimed invention. Appellants respectfully disagree and note that Golander does not use an aqueous solution comprising acrylic acid in the claimed concentration.

Appellants' argument and position is listed above in the argument for Ground 1:2.

**Ground 1:4**

The Examiner argues that the cited references disclose drying the water-absorbing shaped body. In support the Examiner asserts that open-air drying implicitly takes place between Vesley's element 126 and when the composition is wound into a roll. Appellants respectfully disagree with the Examiner.

The Examiner's assertion, which is not backed by any evidence or even assertions of industry standards, is unreasonable. Appellants note that Vesley does not mention drying or use the word drying anywhere in its specification. Vesley states that after optional element 126, the viscoelastic article 116 is collected on a roll 120. See, Vesley, column 5, lines 47 to 65. Specifically, Vesley did not mention drying or mention a drying time anywhere in its specification and did not specifically mention drying between optional element 126 and the roll 120. Furthermore, if drying is implicit between steps, the Examiner has not indicated why drying is not implicit between any other steps of Vesley's process. Appellants note that should drying occur implicitly between the feeder 100 and the nip roll 112, it would render Vesley inapplicable to the claimed invention because there would be no polymerization of an aqueous solution. Therefore, at least, the Examiner would need to supply evidence why drying is implicit only between optional element 126 and roll 120 and not between any other step before asserting an obviousness rejection.

**Ground 1:5**

The Examiner objected to Ground 1:5 in her statements listed under Ground 1:1 of the Examiner's Answer. Appellants have amended Ground 1:5 which is listed above under Ground 1:1.

**Ground 2**

The Examiner alleged that all references are concerned with absorbent polymers and there is a reasonable expectation of success in response to Appellants argument. Appellants respectfully disagree. Appellants' reasons for asserting no expectation of success is listed in the Appeal Brief.

Briefly, the rejection in question is based on Golander, Vesley and Phan. However, Phan teaches against such a combination by stating that a combination of the prior art presents numerous problems and that only the specific configuration of Phan's disclosure can overcome these problems. Phan's disclosure of the many problems and the specific structures needed to overcome these problems is a teaching against the use of any water absorbing shaped bodies in any fiber substrates unless they fit Phan's strict criteria and configuration.


Appellants have asserted (in the Appeal Brief) and continue to assert that the Examiner has failed to show how Golander and Vesley's compositions would fit Phan's strict criteria to avoid the many problems Phan specifically listed. Therefore, there is no expectation that a combination of the cited references would successfully lead to Appellants claimed inventions.

**CONCLUSION**

For the reasons discussed above, the Examiner's rejections are improper and they should be reversed by the Board. Appellants submit that the pending claims are in condition for allowance and earnestly solicit an early Notice to that effect.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

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